

REMARKS

Claims 111, 112, 114-158 and 160-163 are pending in this application. Claims 111, 114 and 157 have been amended. No new matter has been introduced. Claims 113 and 159 have been canceled and their subject matter has been incorporated in amended independent claims 111 and 157, respectively.

Claims 111, 112, 114-117, 120-158 and 160-163 stand rejected under 35 U.S.C. § 102 as being anticipated by Lou (U.S. Patent No. 6,235,579) ("Lou"). This rejection is respectfully traversed.

The claimed invention relates to a metal-polysilicon contact. As such, amended independent claim 111 recites a "metal-polysilicon contact" comprising "a polysilicon layer provided over a substrate," "a barrier layer formed over said polysilicon layer" and "at least one conductive layer formed over said barrier layer in an opening of an insulating layer, said conductive layer having at least one vertically extending surface in said opening." Amended independent claim 111 also recites "at least one layer capable of absorbing oxygen formed adjacent to said conductive layer."

Independent claim 126 recites a "memory cell" comprising "a transistor including a gate," "a capacitor including an electrode" and "a metal-polysilicon structure . . . comprising a polysilicon layer formed over said substrate; a barrier layer formed over said polysilicon layer." Independent claim 126 also recites "at least one conductive layer formed over said barrier layer" and "at least one layer capable of absorbing oxygen formed adjacent to said conductive layer."

Independent claim 136 recites a "metal-polysilicon contact" comprising "a polysilicon layer," "a barrier layer formed over said polysilicon layer" and "at least one conductive layer formed over said barrier layer." Independent claim 136 also recites

"at least one oxygen sink layer formed adjacent to said conductive layer, said oxygen sink layer being at least partially oxidized."

Independent claim 148 recites a "memory cell" comprising "a transistor including a gate," "a capacitor including an electrode" and "a metal-polysilicon structure . . . comprising a polysilicon layer formed over said substrate; a barrier layer formed over said polysilicon layer." Independent claim 148 also recites "at least one conductive layer formed over said barrier layer" and "at least one oxygen sink layer formed adjacent to said conductive layer, said at least one oxygen sink layer being at least partially oxidized."

Amended independent claim 157 recites a "metal-polysilicon contact" comprising "a polysilicon layer provided over a substrate," "a barrier layer formed over said polysilicon layer" and "at least one conductive layer formed over said barrier layer, wherein said conductive layer is made of a material which is conductive when oxidized." Amended independent claim 157 also recites "at least one oxygen sink layer formed adjacent to said conductive layer, said at least one oxygen sink layer being capable of absorbing oxygen to slow down an oxygen front from reaching said at least one conductive layer."

Lou relates to a "method of manufacturing a stacked capacitor." (Abstract). Lou teaches that "[a] first dielectric layer is formed over a substrate," and "[a] first nitride layer is formed on the first dielectric layer" so that "[a] storage node contact hole is formed to penetrate through the first nitride layer and the first dielectric layer and to expose a portion of the substrate." (Abstract). Lou further teaches that "[a] first conductive plug is formed in the storage node contact hole" and "[a] second dielectric layer is formed on the first nitride layer and the first conductive plug." (Abstract). Once "[a] contact hole is formed to penetrate through the second nitride layer and the

second dielectric layer and to expose portions of the first conductive plug," Lou teaches that "[a] second conductive plug is formed in the contact hole with a surface level lower than a surface level of the second nitride layer." (Abstract).

Lou does not anticipate the subject matter of claims 111, 112, 114-117, 120-158 and 160-163. Lou does not disclose, teach or suggest all limitations of independent claims 111, 126, 136, 148 and 157. Lou is silent about a "metal-polysilicon contact" comprising "a polysilicon layer provided over a substrate," "a barrier layer formed over said polysilicon layer" and "at least one conductive layer formed over said barrier layer *in an opening of an insulating layer, said conductive layer having at least one vertically extending surface in said opening,*" as amended independent claim 111 recites (emphasis added). In Lou, metal layer 218, which would arguably correspond to the "conductive layer" of the claimed invention, is not formed "in an opening of an insulating layer, said conductive layer having at least one vertically extending surface in said opening," as in the claimed invention.

Lou is also silent about "a capacitor including an electrode" and "a metal-polysilicon structure . . . comprising a polysilicon layer formed over said substrate," "a barrier layer formed over said polysilicon layer," "at least one conductive layer formed over said barrier layer" and "at least one layer capable of absorbing oxygen formed adjacent to said conductive layer," as independent claim 126 recites. In Lou, metal layer 218 (which would arguably correspond to the "conductive layer" of the claimed invention) forms the lower electrode of the stacked capacitor comprising first metal layer 218, dielectric 224 and second metal layer 226. Thus, metal layer 218 of Lou cannot simultaneously be a "conductive layer" and an "electrode" of the capacitor.

Lou also fails to disclose, teach or suggest a "metal-polysilicon contact" comprising "at least one oxygen sink layer formed adjacent to said conductive layer,

said oxygen sink layer being at least partially oxidized,” as claims 136 and 148 recite. Lou is silent about an oxygen sink layer, much less about an “oxygen sink layer . . . being at least partially oxidized,” as in the claimed invention. Lou is further silent about a “metal-polysilicon contact” comprising “at least one conductive layer . . . made of a material which is conductive when oxidized,” as amended independent claim 157 recites. For at least these reasons, Lou fails to anticipate the subject matter of claims 111, 112, 114-117, 120-158 and 160-163, and withdrawal of the rejection of these claims is respectfully requested.

Claims 118 and 119 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lou. This rejection is respectfully traversed.

Claims 118 and 119 depend on amended independent claim 111 and recite that the barrier layer “has a thickness of approximately 60 to 200 Angstroms” (claim 18) and that the conductive layer “has a thickness of approximately 100 to 300 Angstroms” (claim 119).

The subject matter of claims 118 and 119 would not have been obvious over Lou. Specifically, the Office Action fails to establish a *prima facie* case of obviousness. Courts have generally recognized that a showing of a *prima facie* case of obviousness necessitates three requirements: (i) some suggestion or motivation, either in the references themselves or in the knowledge of a person of ordinary skill in the art, to modify the reference or combine the reference teachings; (ii) a reasonable expectation of success; and (iii) the prior art references must teach or suggest all claim limitations. See e.g., In re Dembiczak, 175 F.3d 994 (Fed. Cir. 1999); In re Rouffet, 149 F.3d 1350, 1355 (Fed. Cir. 1998); Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc., 75 F.3d 1568, 1573 (Fed. Cir. 1996).

In the present case, Lou fails to disclose, teach or suggest all limitations of independent claim 111. As noted above, Lou does not disclose, teach or suggest a "metal-polysilicon contact" comprising "a polysilicon layer provided over a substrate," "a barrier layer formed over said polysilicon layer" and "at least one conductive layer formed over said barrier layer in an opening of an insulating layer, said conductive layer having at least one vertically extending surface in said opening," as amended independent claim 111 recites. In Lou, metal layer 218, which would arguably correspond to the "conductive layer" of the claimed invention, is not formed "in an opening of an insulating layer, said conductive layer having at least one vertically extending surface in said opening," as in the claimed invention. For at least these reasons, the Office Action fails to establish a *prima facie* case of obviousness, and withdrawal of the rejection of claims 118 and 119 is also respectfully requested.

Allowance of all pending claims is solicited.

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Respectfully submitted,

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